IN THE CLAIMS

Please amend the claims as follows:

1. (Original) A method for use in a cardiac stimulation device to differentiate between sinus events and ectopic events, comprising:

sensing the sinus events and the ectopic events;

automatically determining sensing thresholds of the sinus events;

automatically determining sensing thresholds of the ectopic events;

storing the sensing thresholds of the sinus events, the sensing thresholds of the ectopic events, and timing relationships that define sinus intervals and ectopic intervals;

classifying a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the cardiac event to any of the sensing threshold of the sinus events or the sensing threshold of the ectopic events; and

classifying a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the sensed cardiac event to a previous average cycle length in a corresponding cardiac chamber.

2. (Original) The method according to claim 1, wherein the step of automatically determining sensing thresholds of the sinus events comprises:

adjusting a sensitivity setting until an event sensing threshold is determined; and

determining the sinus event sensing thresholds on a rhythmic consistency of occurrence of the sensed events.

3. (Original) The method according to claim 2, wherein the step of automatically determining sensing thresholds of the ectopic events comprises determining the ectopic event sensing thresholds on any one of:

a lack of rhythmic consistency of occurrence of sensed events, or

a rhythmic consistency that is shorter in time than sinus event sensing.

4. (Original) The method according to claim 3, wherein the step of adjusting a sensitivity setting comprises maintaining a sensitivity setting of a first sense amplifier, while adjusting a sensitivity setting of a second sense amplifier.

5. (Original) The method according to claim 3, wherein the step of sensing sinus events comprises sensing any of:

atrial events; or

ventricular events.

6. (Original) The method according to claim 5, wherein the step of sensing ectopic events comprises sensing any of:

premature atrial contractions (PACs), or

premature ventricular contractions (PVCs).

7. (Original) The method according to claim 6, further including the step of determining an event interval by sampling at least two consecutive cardiac cycles to determine a time interval between two sensed events.

8. (Original) The method according to claim 7, further including the step of comparing the event interval to an average sinus interval measured between previously sensed sinus events, and, if the event interval is approximately equal to the average sinus interval, then confirming sinus event detection and sinus sensing threshold.

9. (Original) The method according to claim 8, further including the step of adjusting a sensitivity setting based on a sensing threshold determined for the detected sinus event.

10. (Currently Amended) The method according to claim 8, further including the step of comparing the event interval to [an] the average sinus interval, and, if the event interval is a predetermined amount less than the average sinus interval, then confirming ectopic event detection and an ectopic sensing threshold.

11. (Original) The method according to claim 10, further including the step of setting the predetermined amount less than the average sinus interval to be equal to seventy percent of the average sinus interval.

12. (Original) The method according to claim 11, further including the step of adjusting a sensitivity setting based on a sensing threshold determined for the detected ectopic event.

13. (Original) The method according to claim 11, wherein, if the event interval is not equal to the average sinus interval and is not less than a predetermined percentage of the average sinus interval, re-determining the average sinus interval.

14. (Original) The method according to claim 1, further including repeating the steps of:

determining sensing thresholds of sinus events; and

sensing thresholds of ectopic events on a periodic basis.

15. (Original) The method according to claim 14, further including the step of storing a history of the sensing thresholds of the sinus events, the sensing threshold of the ectopic events, and the event intervals associated with sinus events and ectopic events.

16. (Original) The method according to claim 15, further including the step of displaying a histogram of stored sensing thresholds and stored event intervals.

17. (Original) The method according to claim 12, wherein, upon detecting a high incidence of premature ventricular contractions, differentiating between a premature ventricular contraction and an R-wave based on an undetected, conducted atrial event.

18. (Original) The method according to claim 17, wherein the step of differentiating between a premature ventricular contraction and an R-wave based the undetected, conducted atrial event comprises:

setting an atrial sensitivity to a minimum numerical setting;

re-classifying the premature ventricular contraction as an R-wave if an atrial event is sensed preceding the ventricular event; and

confirming the ventricular event as a premature ventricular contraction if no atrial event is sensed preceding the ventricular event.

19. (Original) The method according to claim 18, further including the step of determining if the atrial event is an atrial sinus event or an atrial ectopic event.

20. (Original) The method according to claim 19, wherein the step of determining if the atrial event is a sinus event or an ectopic event comprises the steps of:

comparing the interval between the atrial event and the ventricular event to a previously measured average atrial-ventricular sinus interval (P-R interval);

classifying the atrial event as a sinus event (P-wave) if the interval between the atrial event and the ventricular event equals the average atrial-ventricular sinus interval; and

classifying the atrial event as a premature atrial contraction if the interval between the atrial event and the ventricular event is stable and does not equal the average atrial-ventricular sinus interval.

21. (Original) The method according to claim 20, further including the step of classifying the atrial event as a premature atrial contraction and the ventricular event a premature ventricular contraction if the interval between the atrial event and the ventricular event is substantially irregular.

22. (Original) The method according to claim 20, further including the step of determining the sensing threshold of the atrial event.

23. (Original) The method according to claim 22, further including the step of storing the sensing threshold of the atrial event and the coupling interval between the atrial event and the subsequent ventricular event in memory.

24. (Original) The method according to claim 22, wherein the step of determining the sensing threshold of the atrial event comprises the step of setting a sensing window relative in time to a preceding detected event, during which the atrial event will be sensed and all other atrial events occurring outside the sensing window will be ignored, while a sensitivity setting is adjusted until the sensing threshold of the atrial event is determined.

25. (Original) The method according to claim 1, further including the step of storing an electrogram of each ectopic event and each sinus event classified according to a sensing threshold.

26. (Original) The method according to claim 1, further including the step of storing an electrogram of each ectopic event and each sinus event classified according to average rate or coupling interval.

27. (Original) The method according to claim 1, further including the step of adjusting a sensitivity setting so that sinus events and one or more ectopic events are detected.

28. (Original) A cardiac stimulation device that differentiates between sinus events and ectopic events, comprising:

electrodes that sense the sinus events and the ectopic events;

a controller connected to the electrodes, that automatically determines sensing thresholds of the sinus events and of the ectopic events;

a storage device that stores the sensing thresholds of the sinus events, the sensing thresholds of the ectopic events, and timing relationships that define sinus intervals and ectopic intervals;

wherein the controller classifies a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the cardiac event to any of the sensing threshold of the sinus events or the sensing threshold of the ectopic events; and

wherein the controller further classifies a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the sensed cardiac event to a previous average cycle length in a corresponding cardiac chamber.

29. (Original) The device according to claim 28, wherein the controller adjusts a sensitivity setting until an event sensing threshold is determined, and determines the sinus event sensing thresholds on a rhythmic consistency of occurrence of the sensed events.

30. (Original) The device according to claim 29, wherein the controller automatically determines the sensing thresholds of the ectopic events by determining the ectopic event sensing thresholds on any one of:

a lack of rhythmic consistency of occurrence of sensed events, or

a rhythmic consistency that is shorter in time than sinus event sensing.

31. (Original) The device according to claim 30, wherein the controller adjusts the sensitivity setting by maintaining a sensitivity setting of a first sense amplifier, while adjusting a sensitivity setting of a second sense amplifier.

32. (Original) The device according to claim 30, wherein the sinus events comprises any of atrial events, or ventricular events.

33. (Original) The device according to claim 32, wherein the ectopic events comprises any of: premature atrial contractions (PACs), or premature ventricular contractions (PVCs).

34. (Original) The device according to claim 28, further including a comparator that compares an event interval to an average sinus interval, and, if the event interval is a predetermined amount less than the average sinus interval, the controller confirms ectopic event detection and an ectopic sensing threshold.

35. (Original) A cardiac stimulation device that differentiates between sinus events and ectopic events, comprising:

means for sensing the sinus events and the ectopic events;

means for automatically determining sensing thresholds of the sinus events and of the ectopic events;

means for storing the sensing thresholds of the sinus events, the sensing thresholds of the ectopic events, and timing relationships that define sinus intervals and ectopic intervals;

means for classifying a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the cardiac event to any of the sensing threshold of the sinus events or the sensing threshold of the ectopic events; and

means for classifying a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the sensed cardiac event to a previous average cycle length in a corresponding cardiac chamber.

36. (Original) The device according to claim 35, wherein the determining means adjusts a sensitivity setting until an event sensing threshold is determined, and determines the sinus event sensing thresholds on a rhythmic consistency of occurrence of the sensed events.

37. (Original) The device according to claim 36, wherein the determining means automatically determines the sensing thresholds of the ectopic events by determining the ectopic event sensing thresholds on any one of:

a lack of rhythmic consistency of occurrence of sensed events, or

a rhythmic consistency that is shorter in time than sinus event sensing.

38. (Original) The device according to claim 37, wherein the determining means adjusts the sensitivity setting by maintaining a sensitivity setting of a first sense amplifier, while adjusting a sensitivity setting of a second sense amplifier.

39. (Original) The device according to claim 37, wherein the sinus events comprises any of atrial events, or ventricular events; and

wherein the ectopic events comprises any of: premature atrial contractions (PACs), or premature ventricular contractions (PVCs).

40. (Original) The device according to claim 35, further including a comparator that compares an event interval to an average sinus interval, and, if the event interval is a predetermined amount less than the average sinus interval, the controller confirms ectopic event detection and an ectopic sensing threshold.

41. (New) A method for use in a cardiac stimulation device, comprising:

sensing cardiac events;

automatically determining sensing threshold of the sensed cardiac events;

classifying the sensing threshold as a sensing threshold for sinus events or a sensing threshold for ectopic events as a function of rhythmic consistency of occurrence of the sensed cardiac event; and

classifying subsequent sensed cardiac events as a sinus event or an ectopic event based on proximity of a sensitivity of the subsequent sensed cardiac event to the sensing threshold of the sinus events or the sensing threshold of the ectopic events.

42. (New) The method of claim 41 further comprising determining a time interval between sensed cardiac events, wherein sensing threshold as a sensing threshold for sinus events or a sensing threshold for ectopic events in accordance with rhythmic consistency of occurrence of the sensed cardiac event comprises comparing the time interval to an average sinus interval to classify the sensing threshold as a sensing threshold sinus events or ectopic events.

43. (New) The method of claim 41 wherein automatically determining sensing threshold of the cardiac event comprises maintaining a first sensitivity setting of a first sense amplifier, while decreasing a second sensitivity setting of a second sense amplifier until the second sense amplifier no longer senses the cardiac event.

44. (New) The method of claim 43 further comprising setting the first sensitivity setting of the first sense amplifier equal to lowest value of the second sensitivity setting for which the second sense amplifier sensed the cardiac event when the time interval between sensed cardiac events is approximately equal to the average sinus interval.

45. (New) A method for use in a cardiac stimulation device, comprising:

increasing sensitivity of an atrial sensing circuit in response to detection of a predetermined number of occurrences of a ventricular event that are classified as premature ventricular contractions;

defining a sensing window relative in time to the ventricular event,

determining regularity of time interval between an atrial event sensed in the sensing window and the ventricular event; and

classifying the atrial event as a detected but non-conducted premature atrial contraction and confirming the ventricular event as a premature ventricular contraction if the time interval is substantially irregular.

46. (New) The method of claim 45 further comprising:

comparing interval between the atrial event and the ventricular event to an average atrial-ventricular sinus interval (P-R interval) if the time interval between an atrial event sensed in the sensing window and the ventricular event is substantially regular; and

classifying the atrial event as a sinus event (P-wave) if the interval between the atrial event and the ventricular event is approximately equal to the average atrial-ventricular sinus interval.

47. (New) The method of claim 46 further comprising classifying the atrial event as a premature atrial contraction if the interval between the atrial event and the ventricular event is not approximately equal to the average atrial-ventricular sinus interval.

48. (New) A method for use in a cardiac stimulation device to differentiate between sinus events and ectopic events, comprising:

sensing the sinus events and the ectopic events;

automatically determining sensing threshold of the sinus events;

automatically determining sensing threshold of the ectopic events;

storing the sensing threshold of the sinus events and the sensing threshold of the ectopic events; and

classifying a sensed cardiac event as a sinus event or an ectopic event based on proximity of sensitivity of the sensed cardiac event to the sensing threshold of the sinus events or the sensing threshold of the ectopic events.

49. (New) The method according to claim 48, wherein the step of automatically determining sensing thresholds of the sinus events comprises:

adjusting a sensitivity setting until an event sensing threshold is determined; and

determining the sinus event sensing thresholds in accordance with rhythmic consistency of occurrence of the sensed events.

50. (New) The method according to claim 49, wherein the step of automatically determining sensing thresholds of the ectopic events comprises determining the ectopic event sensing thresholds on any one of:

a lack of rhythmic consistency of occurrence of sensed events, or

a rhythmic consistency that is shorter in time than sinus event sensing.

51. (New) The method according to claim 50, wherein the step of adjusting a sensitivity setting comprises maintaining a sensitivity setting of a first sense amplifier, while adjusting a sensitivity setting of a second sense amplifier.

52. (New) A cardiac stimulation device that differentiates between sinus events and ectopic events, comprising:

electrodes that sense the sinus events and the ectopic events;

a controller connected to the electrodes, that automatically determines sensing thresholds of the sinus events and of the ectopic events;

a storage device that stores the sensing thresholds of the sinus events, the sensing thresholds of the ectopic events, and timing relationships that define sinus intervals and ectopic intervals; and

wherein the controller classifies a sensed cardiac event as a sinus event or an ectopic event based on proximity of a sensitivity of the sensed cardiac event to any of the sensing threshold of the sinus events or the sensing threshold of the ectopic events.

53. (New) The device according to claim 52, wherein the controller adjusts a sensitivity setting until an event sensing threshold is determined, and determines the sinus event sensing thresholds on a rhythmic consistency of occurrence of the sensed events.

54. (New) The device according to claim 53, wherein the controller automatically determines the sensing thresholds of the ectopic events by determining the ectopic event sensing thresholds on any one of:

a lack of rhythmic consistency of occurrence of sensed events, or

a rhythmic consistency that is shorter in time than sinus event sensing.

55. (New) The device according to claim 54, wherein the controller adjusts the sensitivity setting by maintaining a sensitivity setting of a first sense amplifier, while adjusting a sensitivity setting of a second sense amplifier.

56. (New) The device according to claim 52 the controller further classifies a sensed cardiac event as a sinus event or an ectopic event based on the proximity of the sensed cardiac event to a previous average cycle length in a corresponding cardiac chamber.